



**NTH Consultants, Ltd.**

Infrastructure Engineering  
and Environmental Services

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616.575.1000 Fax

(b) (6) (b) (6)

Walnutdale Farms  
4309 14<sup>th</sup> St.  
Wayland, MI 49348

January 20, 2004  
Proj. No. 13-020064-00

**RE: Walnutdale Farms  
Manure and Storm Water Storage Structure  
Construction Inspection Verification**

Dear Mr. (b) (6)

We have completed the construction quality inspection for the manure and storm water storage structure constructed at Walnutdale Farms, located at 4309 14<sup>th</sup> Street, in Wayland, Michigan. The liner type, clay berm compaction, and overall pond specifications were inspected to assure that the pond is in conformance with the "Waste Storage Facility (No.) 313, Technical Guide Section IV", USDA-NRCS-MICH and applicable NRCS Michigan Construction Specifications.

As a result of a court order, the liner was to be synthetic and/or concrete. As the photographs attached in Appendix A depict, the storage structure was eventually lined with an EPDM Rubber liner with a concrete ramp and solid scrap out area, overlying recompacted clay berms and native clay subsoil. The liner was fastened to the concrete using a proven method known as a batten strip which utilizes a stainless steel strip, wedge type anchor bolts, and neoprene gaskets to fasten the liner to the concrete. The concrete attachment detail was provided on Plate No. 5 of the drawings. Plate No. 5 is attached in Appendix B. The observed workmanship associated with the installation of the liner was outstanding. The concrete was in very good condition and there were no visible cracks, open joints, or pockets from honeycombing. The EPDM liner was spread (but not stretched) in an even fashion minimizing the folds or unintended overlap. The liner warranty is attached in Appendix C. Finally, the batten strip was in exceptional condition without any observable pockets, messy seams, or malfunctioning fasteners.

Prior to the installation of the liner some areas where the spoils from the excavation were used to construct the berm had to be compacted to meet specifications and the site prepared for the



Mr. (b) (6)  
January 20, 2004

liner. During the construction, we (NTH) took a composite sample of the soils to be used for the construction of the berms. The soils were taken to NTH's soil lab where a Standard Proctor was performed in accordance with ASTM D 698. Periodically, throughout the construction of the berms, density tests were performed on the berms to ensure 90% of the maximum density as determined by the above stated method. A total of six tests were performed, two on the northern berm, one on the southern berm, and three on the eastern berm (where the majority of the earthwork with respect to the berms occurred). There were no tests performed on the west east side of the structure as the original elevation was higher and no soils were moved to that location to construct a berm. All of the test locations exceeded the specifications, with the lowest actual reading registering at 95.4% of the maximum density. Information relating to the laboratory data, the actual test results, and the location of the tests are attached in Appendix D. Prior to the installation of the EDPM liner, the site was prepared by removing large cobbles, and compacting and smoothing the final earthen layer. We (NTH) inspected the soils prior to the installation of the liner and no cobbles or uneven surfaces were observed.

The above activities have been performed in conformance with the intent of the current and applicable Michigan NRCS Construction Specifications and the "Waste Storage Facility (No.) 313". Should you have any questions / comments regarding this or any other services we have provided, please do not hesitate to call me at 616-575-1012.

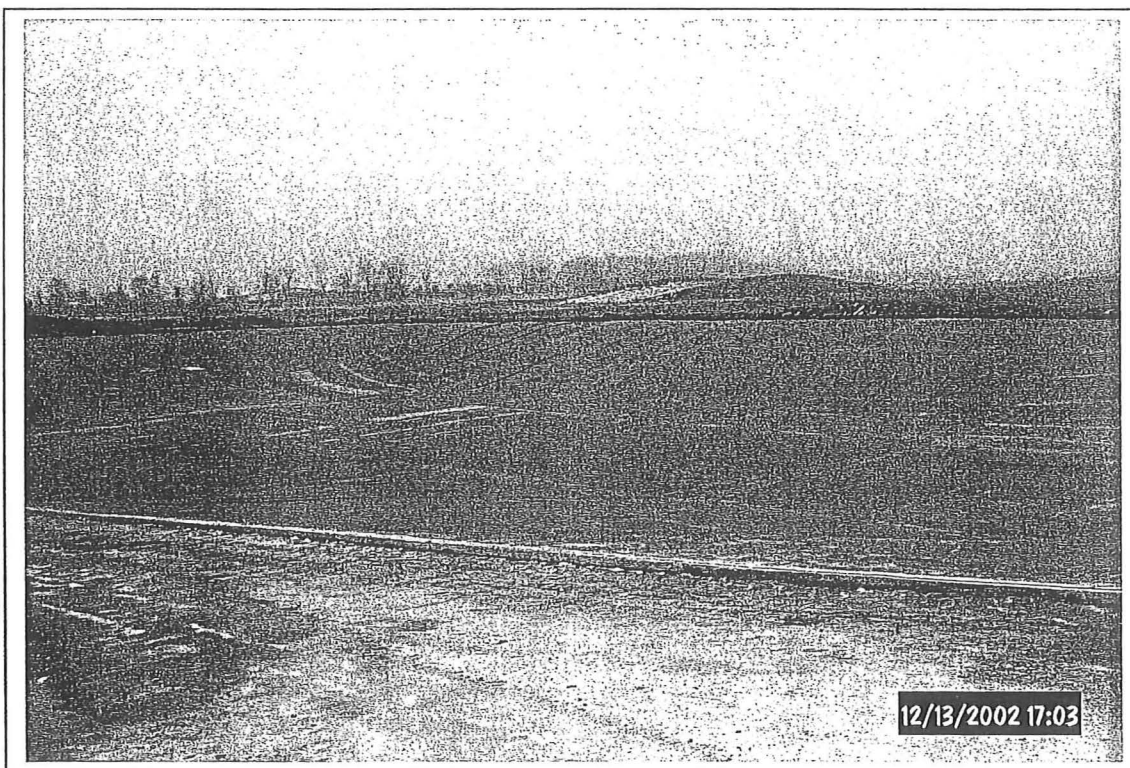
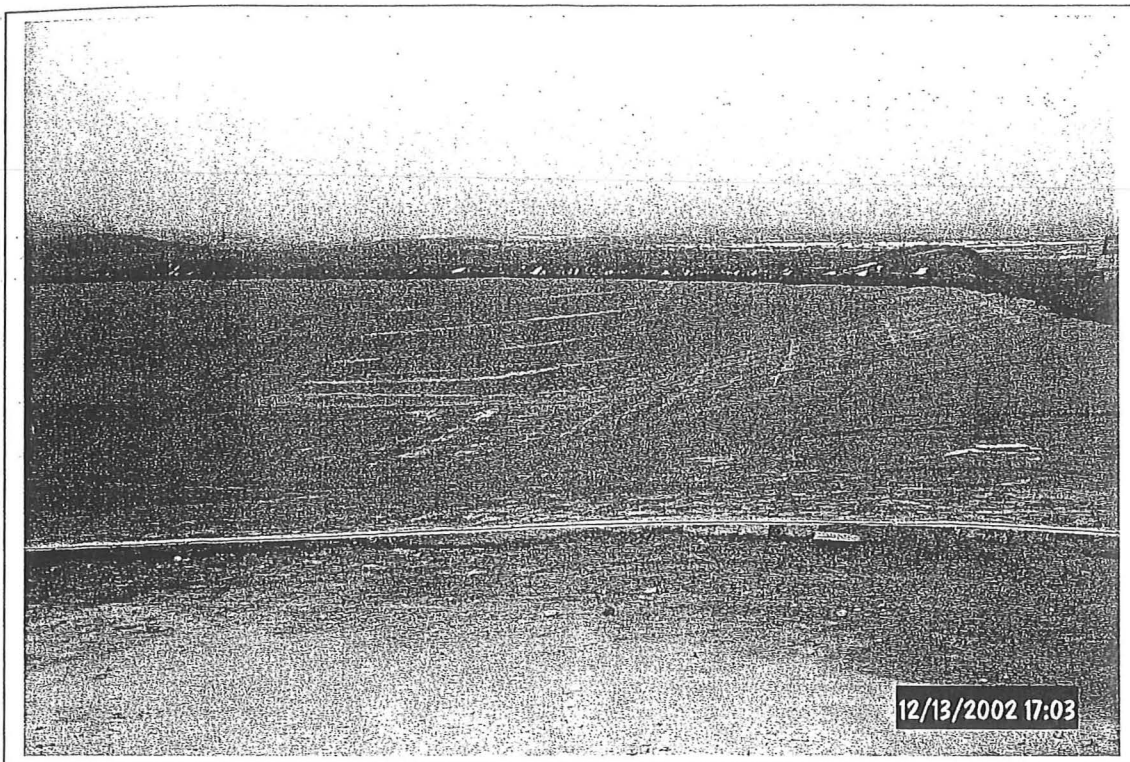
Sincerely,

NTH Consultants, Ltd.

Marc E. Groenleer, P.E.,  
Senior Project Engineer,  
Project Manager

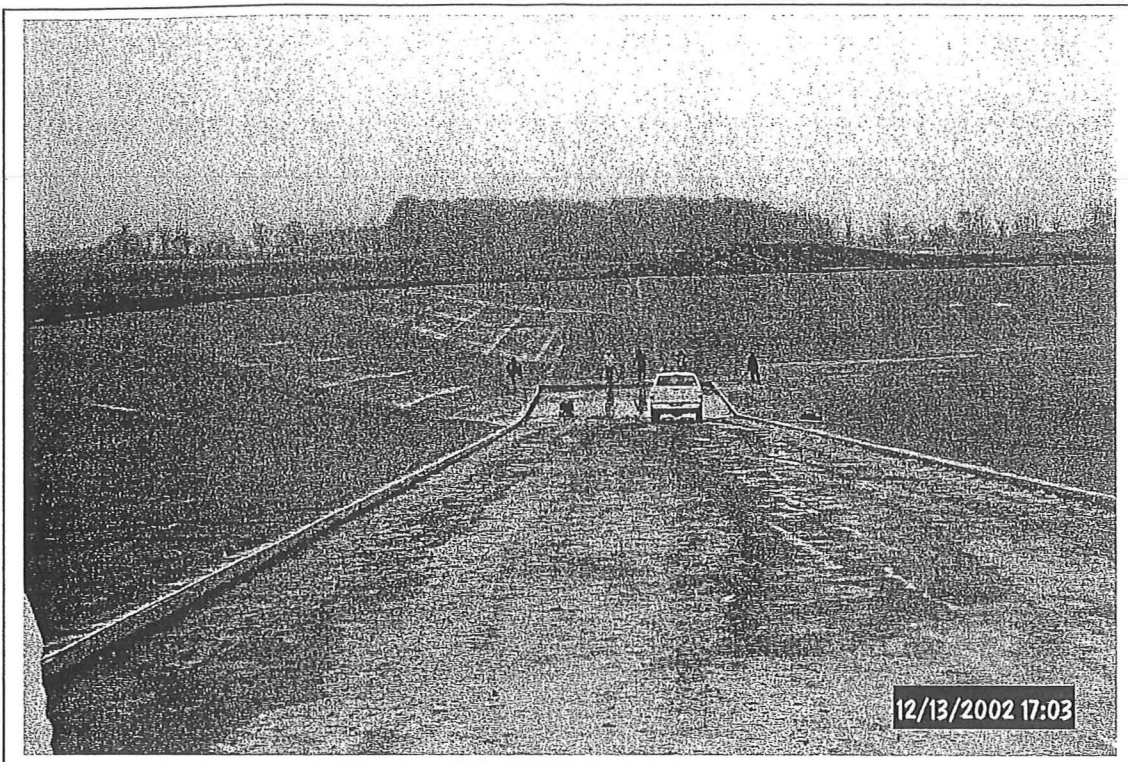
cc: Arron Isherwood, Sierra Club

Attachments



Project No.: 13-020064-00	Walnutdale Farms	Manure and Storm Water Storage Structure Photographs	Date: Jan. 28, 2002
Scale:			
Drawn By:	 <b>NTH Consultants, Ltd.</b> Infrastructure Engineering and Environmental Services Farmington Hills, Detroit, Exton, Grand Rapids, Lansing		
Checked By:			

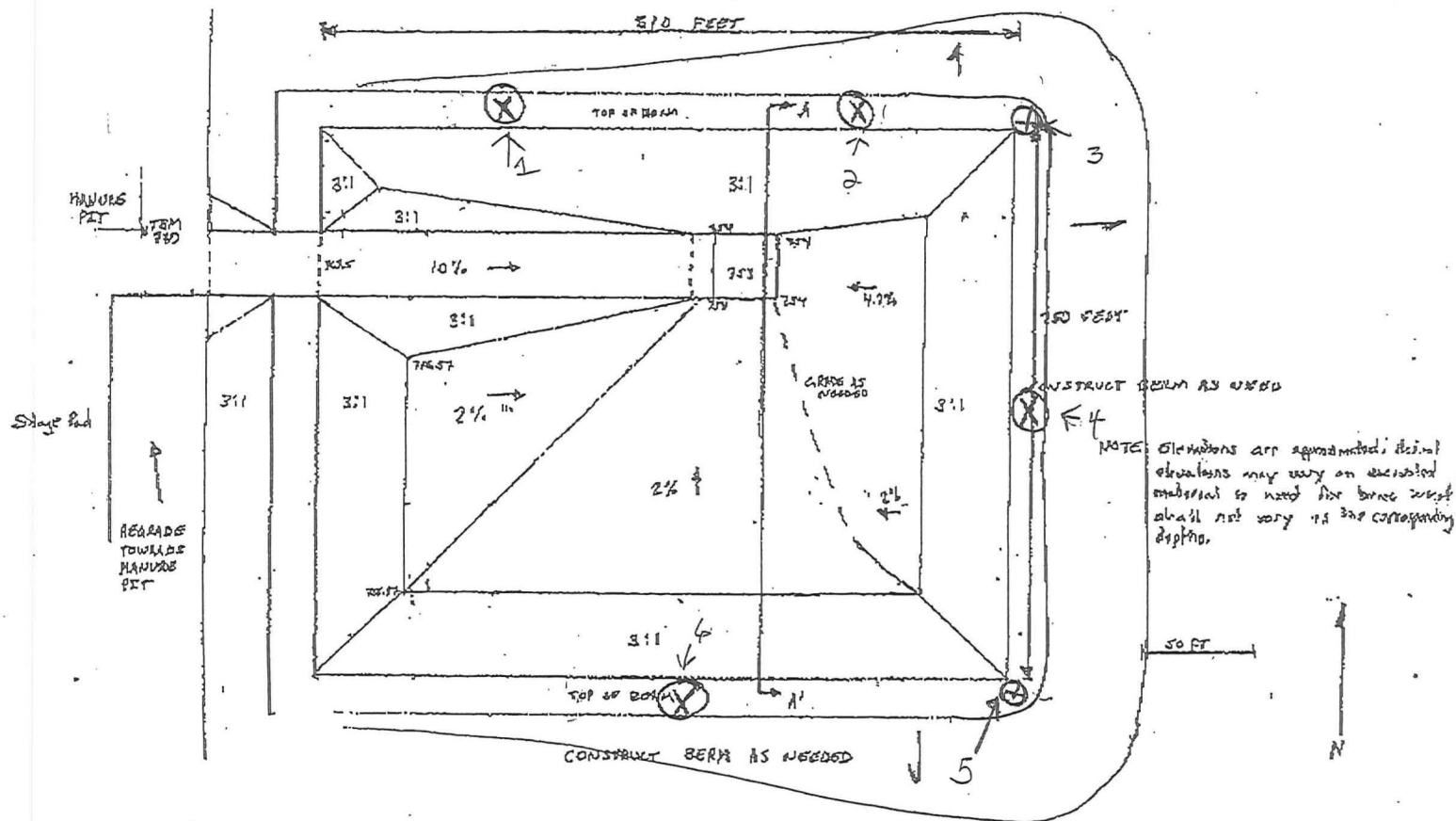




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Project No.: 13-020064-00	Walnutdale Farms	Manure and Storm Water Storage Structure Photographs	Date: Jan. 28, 2002
Scale:			
Drawn By:	 <b>NTH Consultants, Ltd.</b> Infrastructure Engineering and Environmental Services Farmington Hills, Detroit, Exton, Grand Rapids, Lansing		
Checked By:			

THE BENCH MARK AT THE SOUTHEAST CORNER OF THE MANURE PIT IS BASED ON INTERPOLATED ELEVATIONS FROM THE SITE'S TOPOGRAPHIC SURVEY



⊗ Location of Density Test



**ATH Consultants, Ltd.**  
Industrial and Engineering and Environmental Services  
Farmington Hills, Detroit, Essex, Grand Rapids, Lansing

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Walnutdale Dairy Farm

Manure and Storm Water Runoff  
Storage Lagoon

AUG 2002

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KEEPING

3/8" x 3-1/2" LG. S.S.  
WEDGE TYPE ANCHOR BOLT WITH  
NUT & WASHER 6" O.C.

1-1/2" x 1/4" THICK  
S.S. FLAT BAR

2" x 1/4" THICK  
NEOPRENE DOUBLE  
GASKET CONTINUOUS

CAULKING

LINER

1/2" MIN.  
RADIUS AT  
EDGE

4" MINIMUM

## TYPICAL CONCRETE ATTACHMENT

BATTEN TYPE

NTS

### NOTE:

1. CONCRETE SURFACES AT ATTACHMENT LOCATIONS  
TO BE STEEL TROWEL FINISHED OR GROUND  
SMOOTH PRIOR TO INSTALLATION.

DETAIL 1

BACKFILL WITH  
EXCAVATED MATERIAL

24" (MIN)

LINER

VARIES

## "V" ANCHOR TRENCH

NTS

DETAIL 2

# Firestone



## 10 YEAR MEMBRANE WARRANTY

Subject to the following terms and conditions, Firestone Building Products Co. (FBPCO) warrants to the Buyer that the PondGard EPDM membrane material (MEMBRANE) sold to the Buyer will be free from manufacturing defects at the time of sale.

If upon inspection by the Seller, the membrane evidences manufacturing defects, Seller's liability and Buyer's remedies are limited, at Seller's option, to the repair or replacement of the defective membrane at the F.O.B. point in the original contract of sale.

FBPCO further warrants that the Membrane material will not prematurely deteriorate to the point of failure because of weathering for a period of ten (10) years from the date of sale if properly installed, maintained, and used for the purpose for which the Seller intended.

Buyer shall give Seller notice of a claim under this warranty within thirty (30) days of discovering the premature deterioration of the Membrane.

If upon inspection by the FBPCO the Membrane shows premature deterioration because of weathering within the ten (10) year period stated herein, FBPCO's liability and Buyer's remedies are limited at FBPCO option to the providing of repair material for the original Membrane or credit to be applied towards the purchase of a new Membrane, the value of these remedies being determined by FBPCO based upon the number of remaining months of the unexpired warranty used to pro-rate at the current prices for the Membrane. The maximum pro-rated value allowed by FBPCO for repair or credit shall not exceed the original Membrane purchase price. In no event shall FBPCO be responsible for the labor cost to remove or replace the Membrane.

NO REPRESENTATIVE OF FBPCO HAS AUTHORITY TO MAKE ANY REPRESENTATIONS OR PROMISES EXCEPT AS STATED HEREIN.

THERE ARE NO WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THE WARRANTIES CONTAINED IN THIS DOCUMENT. FBPCO SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES, INCLUDING BUT NOT LIMITED TO, LOSS OF PROFITS OR DAMAGES TO THE STRUCTURE OR ITS CONTENTS ARISING UNDER ANY THEORY OF LAW WHATSOEVER.

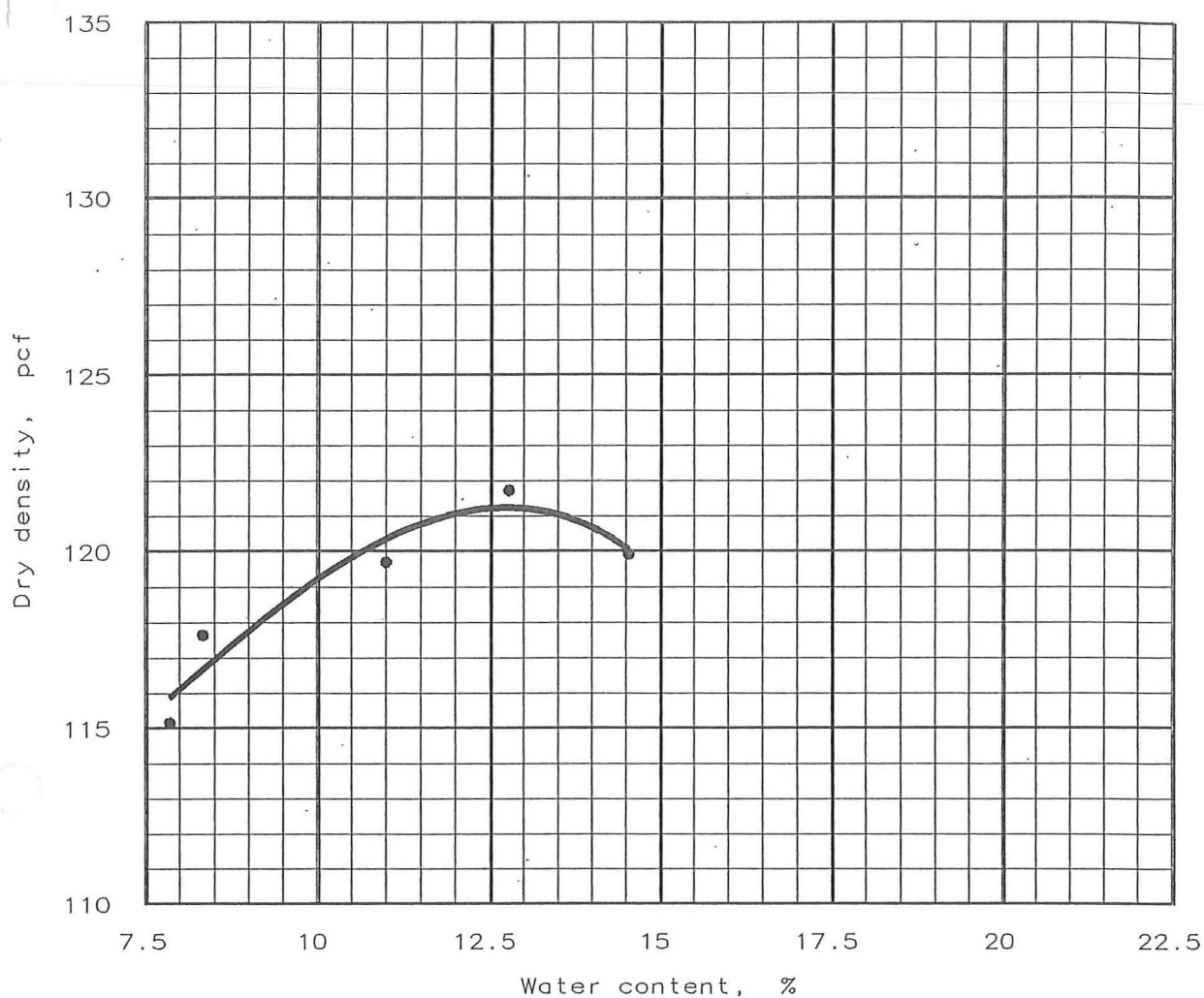
Walnutdale Farms, 131, 142 West, 14 South  
Dorr, MI 49323  
(BUYER)

December 16, 2002  
(DATE)

FIRESTONE BUILDING PRODUCTS CO.

BY   
JOSEPH KALBAS  
DIVISION MANAGER  
SPECIALTY PRODUCTS

# MOISTURE-DENSITY RELATIONSHIP TEST



Test specification: ASTM D 698-78 Method A, Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						

## TEST RESULTS

Maximum dry density = 121.2 pcf  
Optimum moisture = 12.7 %

## MATERIAL DESCRIPTION

Light Brown CLAY

Project No.: 13-020064-00

Project: Walnutdale

Location: Dorr, Michigan

LWO #12581

Date: 10-29-2002

Remarks:

Bag #1

Tested By: EDD/JB

Checked By: MEG

MOISTURE-DENSITY RELATIONSHIP TEST  
NTH CONSULTANTS, LTD.

Fig. No. \_\_\_\_\_



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MOISTURE-DENSITY TEST DATA

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DATA FILE: 198

PROJECT DATA

Test Date: 10-29-2002  
 Project No.: 13-020064-00  
 Project: Walnutdale  
 Location 1: Dorr, Michigan  
 LWO #12581  
 Marks 1: Bag #1  
 Tested By: EDD/JB  
 Checked By: MEG  
 Material 1: Light Brown CLAY  
 Description 2:  
 Location or depth:  
 No.:

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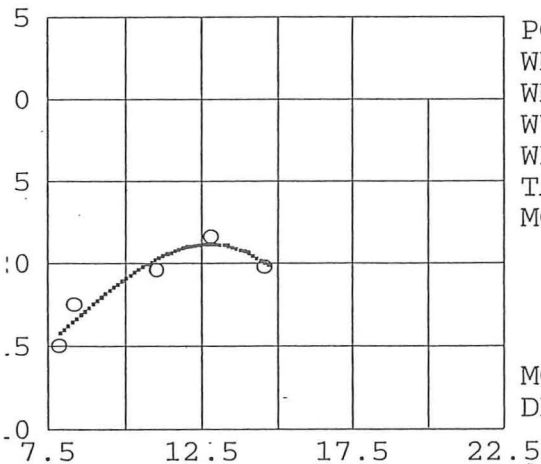
SPECIMEN DATA

Soil classification: AASHTO classification:  
 Natural moisture: Specific gravity:  
 Percent retained on No. 4 sieve:  
 Percent passing No. 200 sieve:  
 Liquid limit: Plastic limit: Plasticity index:

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TEST DATA AND RESULTS FOR CURVE 1

Type of test: Standard, ASTM D 698-78 Method A



POINT NO.	1	2	3	4	5
WM + WS	6462	6511	6593	6660	6661
WM	4584	4584	4584	4584	4584
WW+T #1	211.00	210.90	224.80	231.50	233.10
WD+T #1	196.50	195.60	203.70	206.60	205.00
TARE #1	11.80	11.80	11.70	11.80	11.70
MOIST #1	7.9	8.3	11.0	12.8	14.5

MOISTURE	7.9	8.3	11.0	12.8	14.5
DRY DEN	115.2	117.7	119.7	121.7	119.9

Max dry den= 121.2 pcf, Opt moisture= 12.7 %

